

REMARKS

The Office Action of October 26, 2005 has been carefully reviewed and these remarks are responsive thereto. Reconsideration and allowance of the instant application are respectfully requested. Claims 29-40 are pending.

The undersigned wishes to thank the Examiner for the Interview conducted on March 15, 2006. The Examiner provided an Interview Summary form.

Claim 29 recites a *greenhouse* comprising a *substantially transparent surface* and a *protective coating* on said substantially transparent surface where the protective coating comprises a pigment and a binder. The binder comprises a vinyl polymer based on one or monomers selected from the group consisting of methyl metacrylate, butyl acrylate, 2-ethylhexyl acrylate, ethyl acrylate, styrene, methacrylic acid and acrylic acid having a molecular weight of 10,000-100,000 and an acid value of 40-250. The binder has a polydispersity of 2-6 and a glass transition temperature of 10 to 60°C. The protective coating remains in place until the application of a remover comprising a base and a complex former.

Background:

The present invention provides a protective coating for greenhouses which not only affords protection against (solar) radiation, it has an excellent adhesive strength not found in prior art protective coatings. The coating is sufficiently stable to afford prolonged protection against radiation, without requiring interim repair. Further, the coating is very resistant to various weather influences, such as rain and frost.

Moreover, the protective coating can be easily removed at the moment in a manner that is not particularly labor-intensive nor requires chemicals that affect the environment unacceptably and/or constitute health hazards. Thus a feature of the invention is that the protective coating is removable with a removing agent comprising a base and a complex former.

The binder comprises a polymer having a weight-average molecular weight of 10,000-100,000 and an acid value of 40-250. The binder has a polydispersity of 2-6 and a glass transition temperature of 10 to 60°C. It was discovered that the combination of these parameters provides

the protective coating that does not degrade over time. That is, the present invention is directed to the discovery of a balance of molecular weight and acid number to achieve a protective coating that is sufficiently waterproof and stable on a greenhouse, but readily removable at the end of the season by treatment with an alkaline removing agent. The prior art simply does not teach or suggest the specific combination or the results obtainable thereby.

Binders tend to degrade under the influence of solar (UV) radiation. Low weight-average molecular weight polymers typically contain short polymer chains which, when they breakdown, lead to small degradation products having little, if any, binding characteristics. Higher weight-average molecular weight polymers have longer polymer chains which, when they breakdown, lead to larger degradation products which maintain binding characteristics.

On the other hand, if the molecular weight of the polymer is too high, the hydrophobic character of the binder increases having an adverse effect on water solubility. Binders containing such polymers are difficult to remove from transparent surfaces.

Furthermore, the acid number affects the solubility of the binder. A higher acid number improves the water solubility.

It was discovered that a binder having a glass transition temperature between 10 and 60°C exhibits particularly suitable *adhesion* to a surface of a greenhouse and yields a protective agent that has good handling properties and is easy to apply to form the protective coating.

Rejections

Claims 29-37 and 39-40 stand rejected under 35 USC 103(a) as unpatentable over Yoshida et al. (5,574,117) in view of EP 0478067. Claim 38 stands rejected under 35 USC 103(a) as unpatentable over Yoshida et al. (5,574,117) in view of EP 0478067 and further in view of Wieczorrek et al. (4,409,266).

Yoshida generally describes an acrylic polymer which is used for a variety of purposes such as an adhesive on tape, an alkali-soluble film, alkali-soluble injection molded objects, and water ink. As recognized in the Office Action, the number average molecular weight is 1000 to 1,000,000. However with a disclosed Mw to Mn ratio of less than 5, the weight average

molecular weight ranges from less than 5000 to 5,000,000. This range of molecular weight overlaps but is much *broad*er than the molecular weight (10,000 to 100,000) of the instant claims. Likewise, Yoshida suggests that the film should have a glass transition temperature of - 80 °C or higher (with no upper limit provided.) Again the range of glass transition temperature overlaps but is much *broad*er than the glass transition temperature (10 to 60°C) of the instant claims.

As discussed above, having a too high or too low molecular weight and a too high or too low a glass transition temperature does not provide a protective coating suitable for a greenhouse. Yoshida does not teach or suggest the *specific* parameters needed for a binder suitable for a protective coating on a greenhouse that will not degrade over time.

In regard to the alkali-soluble films, Yoshida suggests the film is useful in packaging film, a base material for labels, and a separating film. As stated in column 8, lines 24-27: "For practical examples the separating film there are cited film for agricultural use, packaging of the washing, packaging of food for animals, a temporary protecting film and so forth." There is nothing suggesting the term "agriculture uses" means or refers to applying a coating to greenhouses.

Several examples are referred to as teaching the starting material. Example 1-1 describes a molecular weight (9,000) and Mw/Mn (polydispersity) value (1.8) outside the claimed range. Likewise Example 2-17 describes a molecular weight (168,000) and Mw/Mn (polydispersity) value (1.7) outside the claimed range. Example 2-21 describes a polymer "used as a pigment-dispersing agent and the like for water ink and the like". Example 2-21 does not teach or suggest applying the polymer coating to a transparent surface of a greenhouse.

Yoshida does not teach or suggest applying a coating to a transparent surface of a greenhouse. Thus, Yoshida does not recognize the problems associated with protective coatings on greenhouse surfaces due the effects of intense solar radiation and weather. There is simply no reason one skilled in the art would have selected the particular parameters of the instant claims to produce a coating suitable for transparent surfaces on a greenhouse and then apply it to a transparent surface.

EP 478067 (EP '067) does not remedy the defects of Yoshida. EP '067's only example is *outside the scope of the claims* and does not provide the desired results. Thus EP '067 does not recognize the necessary parameters to achieve the effects of the instant claims. As discussed in the instant specification, the present invention is an improvement over EP '067.

While EP '067 may discuss vinyl polymers in general, it fails to disclose the important determination that a vinyl polymer can be used as a binder for a commercially acceptable protective coating that has "a weight-average molecular weight of 10,000-100,000 and an acid value of 40-250, wherein the binder has a polydispersity of 2-6 and a glass transition temperature of 10 to 60 °C, and wherein the protective coating is on said substantially transparent surface and the protective coating is removable with a removing agent comprising a base and a complex former."

As pointed out in the July 24, 2002 Declaration of Mr. Bertels (an inventor in the instant application and in EP '067), the only specific product in EP '067 is outside the scope of the present invention and does not possess the advantages of the instant application. Thus, EP '067 does not direct one skilled in the art to select the claimed binder parameters from the very broad disclosures of Yoshida to provide a protective coating for greenhouses.

Moreover, there is nothing in Yoshida that would suggest the compositions disclosed therein would provide an unexpected improvement over the teachings of EP '067. In other words, it is only the hindsight application afforded by the present invention that one skilled in the art would have produced a composition in accordance with the instant claims and applied such composition to a transparent surface of a greenhouse to protect plants from radiation heat or light.

Yoshida does not teach or suggest applying its composition to a transparent surface of a greenhouse and thus does not recognize that improved properties can be obtained over the composition disclosed in EP '067.

Wieczorrek is directed to a shatterproof coating for glass surfaces. Wieczorrek does not teach or suggest a protective coating for the transparent surface of a greenhouse in accordance with the instant claims and does not remedy the defects of Yoshida.

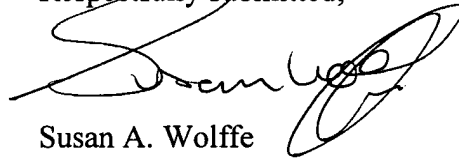
Withdrawal of the instant rejections is requested.

CONCLUSION

Examination of the instant claims is requested. In addition, applicants respectfully submit that the instant application is in condition for allowance, and respectfully solicit prompt notification of the same.

A Petition For Extension of Time and a Fee Transmittal accompany this response. Please charge any additional fees or credit any overpayments to Deposit Account No. 19-0733.

Respectfully submitted,



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